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DEVICE FOR CONTROLLING AN INTERNAL COMBUSTION ENGINE
[Vorrichtung zum Steuern einer Brennkraftmaschine]

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Claims

/1*

1. Device for controlling an internal combustion engine, consisting of a supercharger which is rpm-coupled to the internal combustion engine, which can be controlled in its air throughput according to the power demand, and to which in the partial load range of the internal combustion engine air is supplied with a higher pressure as it is expelled on the outlet side to the inlet of the internal combustion engine, characterized in that the supercharger (3) is moreover rpm-coupled to the gas engine (6) which is driven by the exhaust gas of the internal combustion engine (1).

2. Device as claimed in Claim 1, characterized in that the ratio of the rpm between the supercharger (3) and the gas engine (6) can be varied.

3. Device as claimed in Claim 1 or 2, characterized in that the ratio of the rpm between the internal combustion engine (1) and the supercharger (3) can be varied.

4. Device as claimed in one of the preceding claims, characterized in that the gas engine (6) consists of a rotary piston engine.

5. Device as claimed in one of the preceding claims, characterized in that the supercharger (3) consists of a rotary piston engine with internal and external rotors (8, 9) which run interdigitally engaged, the filling of the working chambers which are located between the internal and external rotors (8, 9) being controllable by variable start and end of intake.

6. Device as claimed in one of Claims 1 to 4, characterized in that the supercharger (3) consists of a rotating vane engine, the

* Numbers in the margin indicate pagination in the foreign text.

filling of the working chambers which are located between the vanes being controllable by variable start and end of intake.

Specification

The invention relates to a device for controlling an internal combustion engine according to the preamble of Claim 1.

Such a device is known from DE-PS 31 44 712 for implementing the process given in the document, according to one embodiment the ratio of the rpm between the internal combustion engine and the supercharger being fixed and a control means controlling the inlet region of the supercharger so that in the partial load range air enters the working chambers with a higher pressure as it is expelled to the inlet of the internal combustion engine, i.e., the supercharger acts as a gas engine and delivers power to the internal combustion engine.

DE-OS 24 02 621 discloses a device in which according to one embodiment (Figure 4) two rotary piston engines are mechanically coupled, one working as a compressor and the other as an engine which is supplied from the combustion chamber with compressed gas which expands in the working chambers.

On this basis the object of the invention is to configure a generic device such that the advantage of power delivery to the internal combustion engine in the partial load range can be achieved and the energy contained in the exhaust gas can be exhausted.

This object is achieved by the combinatorial measures given in the characterizing part of the claim; advantageous developments are given in the dependent claims.

The advantages indicated in the formulation of the object have become attainable by the invention. Moreover there is good load assumption when the load demand has changed, and fuel savings can be expected.

One embodiment of the invention is shown in the drawings and is described below.

Figure 1 shows a schematic of the device,

Figure 2 shows one embodiment of the controllable supercharger.

As shown in Figure 1, the internal combustion engine is rpm-coupled by way of a transmission 2 to a supercharger 3 which has a control means 4 for controlling the air throughput which is to be supplied to the internal combustion engine by way of an intake channel 5 according to the power requirement.

A gas engine 6 is likewise rpm-coupled to the supercharger 3 and is supplied with the exhaust gas of the internal combustion engine by way of an exhaust channel 7.

The fuel mass flow can be controlled in parallel with the control of the air throughput or with the incorporation of a microcomputer; this is not detailed.

Figure 2 shows one execution of the control means 4 for the supercharger 3, consisting of a rotary piston engine with internal and external rotors 8, 9 which run interdigitally engaged, whose profile teeth 10 and tooth spaces 11 form working chambers in which the air is conveyed from the inlet 12 to the outlet 13. The filling of the working chambers with air is determined by variable start and end of intake, for which channels 14 which are located in the inlet region 12 can be controlled by way of slide valves 15, 16 which are coupled by linkage or gearing which are not shown or independently of one another by program-controlled actuators.

The coupling of the slide valves enables sensitive control of the air throughput. In the partial load range expansion of the air takes

place in the working chambers, by which power is delivered by way of coupling to the internal combustion engine. For a sudden load demand power is briefly taken from the internal combustion engine until the amount of exhaust gas has risen as a reaction to the increase in the air throughput and delivers enough drive energy which is converted into output power for the supercharger in the gas engine which is preferably also made as a rotary piston engine.

According to other embodiments, the ratio of the rpm between the supercharger and the gas engine or the internal combustion engine and the supercharger can advantageously be varied. The gas engine can consist of a rotary piston engine in the same manner as the supercharger.

Fig.1

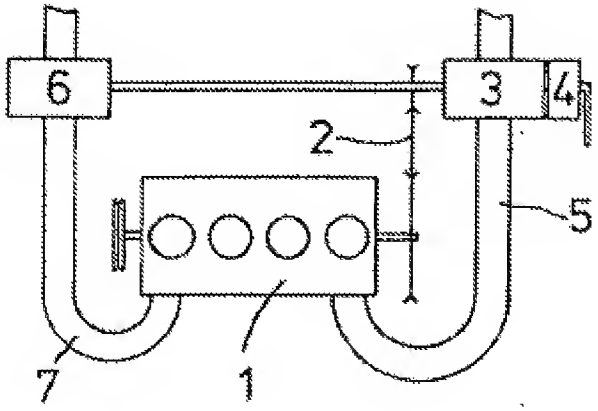

Fig. 2